Intermetallic growth of SAC237 solder paste reinforced with 0.01wt.% multi-walled carbon nanotubes

ABSTRACT

The formation of intermetallic compound (IMC) layer at the interfaces of pad finishes have been studied. The growth of IMC layer after as reflow process and its properties were also discussed. In this study, solder alloy SAC237 (Sn: 99 wt.%, Ag: 0.3 wt.%, Cu: 0.7 wt.%) reinforced with 0.01 wt.% Multi-Walled Carbon Nanotubes (MWCNTs) was mixed to form a composite solder paste and soldered on Electroless Nickel Immersion Gold (ENIG) and Immersion Tin (ImSn) pad finishes. Reflow process was conducted in oven with specific reflow profile. The growth and properties of IMC layer were analysed using optical microscope with image analyzer. Results show that the thickness of IMC layer for ENIG and ImSn were 1.49 µm and 2.51 µm respectively. Floating IMC and voids within the solder bulk and IMC layer were also identified in the samples. In addition, the measured wetting angle for ENIG and ImSn were 16.21° and 34.32°.

Keyword: SA237; Multi-walled carbon nanotubes; Electroless nickel immersion gold; Immersion tin; Intermetallic compound